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CASE STUDY: LATERAL RECTUS PALSY

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Abstract
Lateral rectus palsy, also known as abducens nerve palsy, primarily results from damage to the sixth cranial nerve. Head trauma is one of the most common causes of this condition. Trauma to the orbital or facial muscles can also directly or indirectly affect the lateral rectus (LR) muscle. Diagnosis is mainly through physical examination, confirmed by CT or MRI scans. The pathophysiology of LR palsy involves ischemia or dysfunction of the sixth nerve, or lesions affecting the surrounding nerves, leading to symptoms such as diplopia. Management of LR palsy is challenging; it typically resolves on its own within six months or can be treated with Botulinum toxin injections. This report presents a case of lateral rectus palsy resulting in diplopia in a 40-year-old female patient. She was admitted with complaints of head injury, episodic vomiting, and irrelevant talk. The patient was treated in a private hospital with neuroprotective drugs and corticosteroids.

KEY WORDS: LR-Lateral Rectus, MRI- Magnetic Resonance Imaging, CT scan- Computed Tomography, CRPC-Reactive Protein.

Introduction
Lateral rectus palsy is a rare clinical condition typically caused by abnormalities in the sixth cranial nerve [1]. This condition involves lesions that can occur anywhere between the sixth nerve nucleus in the dorsal pons and the lateral rectus muscle within the orbit [2]. The sixth cranial nerve, with the longest subarachnoid course among all cranial nerves, innervates the lateral rectus muscle responsible for eye abduction [3]. The muscle is believed to have a dual embryonic origin, and the abducens nerve innervates it through multiple trunks [4], potentially dividing the lateral rectus into superior and inferior compartments, affecting one or both [5].

Clinical manifestations include the sudden onset of horizontal double vision exacerbated by looking with the affected eye, sometimes progressing to convergent strabismus when viewing distant objects [6]. Contributing factors to the condition include inadequate blood supply to the sixth cranial nerve due to conditions such as hypertension, diabetes, direct tumor pressure, middle ear infections, head trauma from accidents, or nerve-specific inflammation [7].
Diagnosis of lateral rectus palsy involves detailed patient history, measurement of strabismus and eye movements, assessment of the area of single vision, blood tests, and brain MRI or CT scans for confirmation [8].

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This condition often resolves within 3-6 months post-head injury or can be managed with temporary plastic prisms in glasses to alleviate symptoms, or with Botulinum toxin injections into the lateral rectus to reduce convergent strabismus [9].

In this case, the patient experienced sudden double vision days after a head injury, with subsequent formation of subdural hematoma in the bilateral frontal region.

Epidemiology

Sixth cranial nerve palsy is a rare condition, typically affecting ocular motor nerves in adults with limited incidence [10]. In children, it commonly affects the fourth cranial nerve, with an incidence rate of 2.5 cases per 100,000 [11]. The incidence of sixth cranial nerve palsy varies depending on the severity of symptoms, with traumatic causes accounting for incidence rates ranging from 3% to 30%.

A 15-year study conducted in the United States reported 4 cases of bilateral sixth nerve palsy and 16 cases of multiple cranial nerve palsy.

Case Report

We present the case of a 40-year-old woman who experienced a road traffic accident, skidding, and falling from a bike around 8 pm. Upon presentation, she complained of head injury, vomiting, and irrelevant speech. There were no fractures noted, and she did not report double vision.

Blood examination revealed anemia (Hb 8.7 g/dL) and an elevated total white blood cell count of 14,320 cells/mm³. Additionally, the C-reactive protein (CRP) level was elevated at 60.9 mg/L, indicating a blood infection post-hospitalization. Liver and renal function parameters were within normal limits.

CT Brain evaluation showed bilateral frontal lobe hemorrhagic contusion with surrounding edema, as well as mild white matter edema with hemorrhagic contusions.

Treatment initiated included:

- **Antibiotics:** INJ Cefuroxime Axetil + Potassium Clavulanate 1.5 g IV BD
- **Antiepileptic:** INJ Brivaracetam 50 mg IV TDS
- **Hemostatic Agent:** INJ Tranexamic Acid 500 mg IV TDS (to prevent bleeding)
- **Vertigo Treatment:** T Betahistine 16 mg RT TDS
- **Anti-seizure Medication:** INJ Fosphenytoin 150 mg IV TDS
- **Neuroprotective Therapy:** INJ Edaravone 50 mg IV BD
- **Anti-inflammatory:** INJ Dexamethasone 4 mg IV TDS
- **Symptomatic Relief:** T Prochlorperazine 5 mg RT BD, T Domperidone + Naproxen P/O TDS (for headache, vomiting, and sensitivity to light and sound)

During treatment, she developed hyponatremia due to antiepileptic medication, which was managed with 3% saline infusion.

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This case underscores the complex management required for patients with severe head trauma, involving multiple interventions to address neurological, hematological, and systemic complications.

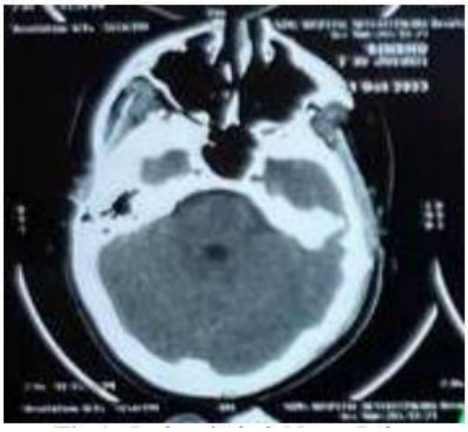

Fig.1. Isolated Sixth Nerve Palsy

In Figure 1, the abducens nerve shows the highest incidence of isolated ocular palsy among other cranial nerves. This condition typically causes the affected eye to turn inward (medially), resulting in pronounced esodeviation when looking toward the affected eye or focusing on distant objects.

Figure 2A depicts bilateral sixth nerve palsy, a rare occurrence following head trauma and often detected differentially on CT Brain scans. Radiological findings may reveal inflammation (myositis) primarily affecting the extraocular muscles, as shown in Figure 2B.

Fig.2A. Bilateral Abducens Nerve Palsy Fig. 2B. Swelling of lateral rectus nerve

DISCUSSION

Sixth cranial nerve palsy is a rare but recognized consequence of head trauma. Also known as the abducens nerve, it manifests as an abduction deficit, which can range from complete paralysis (palsy) to partial weakness (paresis), resulting in esotropia and reduced abduction on the affected side. Patients often present with symptoms of diplopia. Sixth cranial nerve palsy can occur at any age and requires evaluation through MRI of the brain and analysis of cerebrospinal fluid. In this case, the patient underwent laboratory examinations, CT scan, and MRI for diagnostic purposes.

Unilateral palsy of the sixth cranial nerve is reported to occur in 1% to 2.7% of all head trauma cases. Adam Geressu et al. [12] reported on a 29-year-old patient admitted to the emergency department after falling 15 feet from a roof. A non-contrast CT scan revealed a bony spur near the left lateral rectus muscle, resulting in diplopia and complete loss of left eye abduction. Surgical removal of the bony spur and orbital wall reconstruction did not initially resolve the condition, with subsequent atrophy of the left lateral rectus muscle. Improvement in abduction was noted three months later.

Hirotaka Kato et al. presented a case of a 50-year-old man with recurrent transient diplopia episodes over 16 months, lasting between 2 weeks and 3 months. Isolated left abducens palsy during these episodes was attributed to neurovascular compression observed on MR imaging.

David J. Fam et al. [13] reported on an 83-year-old woman involved in a motor vehicle accident, presenting with bilateral sixth nerve palsies and persistent binocular diplopia. MRI showed no additional lesions, and despite some improvement in abduction ability after a year, residual palsies and diplopia persisted.

In our case, the diagnosis of lateral rectus palsy was supported by computed tomography of the brain. The patient was managed according to standard treatment guidelines, including antibiotics, antiepileptic drugs, neuroprotective agents, and supportive medications. Given the rarity of lateral rectus palsy, careful attention and critical evaluation of risks and benefits are crucial for healthcare providers treating such patients.

CONCLUSION

Lateral rectus palsy, also referred to as "abducens nerve palsy," typically results from damage to the sixth cranial nerve. This condition manifests with common symptoms such as diplopia, episodic vomiting, irrelevant speech, and headaches. Diagnosis in this case report was supported by MR imaging and CT Brain, following an accidental trauma that caused damage to the sixth cranial nerve. The management of lateral rectus palsy is challenging; it often resolves spontaneously within six months or may require treatment with Botulinum toxin injections, which can be costly. In this instance, the patient received symptomatic management to address their symptoms effectively.

REFERENCE

1. Pramod Kumar Pandey, Vishaal Bhambhwani, Sriram Thirumalai, PC Ranjith, Poonam Gupta. Lateral Rectus Superior Compartment Palsy. American Journal of ophthalmology. 2015; 160 (1): P205-206.
2. Carmen Chan. John Chen, Rauan Kaiyrzhanov, et al. Neuro- Ophthalmic Literature Review. An International Journal of Neuro- Ophthalmology. 2017; 41 (2): 109-115.
3. Alan B. Scott, MD, Stephen P. Kraft, MD, FRCS. Botulinum Toxin Injection in the Management of Lateral Rectus Paresis. American Academy of Ophthamology. 1985; 92 (5): P676-683.

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 12, Iss 1, 2023

4. Sana Nadeem. Lateral Rectus Superior Compartment Palsy. Pakistan Journal of Ophthalmology. 2020; 36 (3): 298-301.Joo W, Yoshioka F, Funaki T, Rhoton Jr AL. Microsurgical anatomy of the abducens nerve. Clinical Anatomy. 2012; 25 (8): 1030-1042.
5. Jong S. Kim, MD, Joong K. Kang, MD, et al. Isolated or Predominant Ocular MotorNerve Palsy As a Manifestation of Brain Stem Stroke. AHA Journal. 1993; 24 (4): P581-586.
6. Steven R. Hamilton, MD, Simmons Lessell, MD. Recurrent Idiopathic Lateral Rectus Muscle Palsy in Adults. American Journal of Ophthamology. 1991; 112 (5): P540-542.
7. Christopher Elder, Clotilde Hainline, Steven L. Galetta, et al. Isolated Abducens Nerve Palsy: Update on Evaluation and Diagnosis. An International Journal of Neuro-Ophthalmology. 2016; 16:69.
8. Scott AB, Kraft SP. Botulinum toxin injection in the management of lateral rectus paresis. Ophthalmology. 1985; 92: 676-683.
9. Hofer JE, Scavone BM. Cranial nerve VI palsy after dural-arachnoid puncture. AnesthAnalg. 2015; 120 (3):644-646.
10. Jung EH, Kim SJ, Lee JY, Cho BJ. The incidence and etiology of sixth cranial nerve palsy in Koreans: A 10-years nationwide cohort study. Sci Rep. 2019; 9 (1):18419
11. Adam Geressu, Jayaprakash Patil, Jessica Cody. Acute Bducens Nerve Palsy in a Patient who sustained Mechanical Trauma to the Orbit. British and Irish Orthoptic Journal. 2021; 17 (1): P150-154.
12. Hirotaka Kato, Masashi Nakajiima, Yohei Ohanka, et al. Recurrent abduncens nerve palsy assosciated with neurovascular compression. Journal of the Neurological Sciences. 2010; 295 (1-2): P135-136.
13. David J. Fam, MoogehBaharnoori, Charles D. Kassardjian, Gustavo Saposnik. Posttraumatic Bilateral Abducens Nerve Palsy: Mechanism of Injury and Prognosis. Canadian Journal of Neurological Sciences. 2015; 42 (5): P344-346